

Claims

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1. A method for generating oligodendrocytes, suitable for repairing damage caused by demyelinating diseases, comprising growing embryonic stem (ES), embryoid bodies (EB) and/or neurosphere (NS) cells in the presence of one or more gp130 activators selected from CNTF, OSM, IL-6, IL6R/IL6 chimera and IL-11.

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2. The method according to claim 1, wherein the gp 130 activator is an IL6R/IL6 chimera, a mutein, functional derivative, active fraction, circularly permuted derivative or salt thereof.

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3. The method according to claim 2, wherein the gp 130 activator is IL-6.

4. The method according to anyone of claims 1 to 3, wherein the cells are NS cells.

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5. The method according to claim 4, wherein the cells are dissociated NS cells.

6. The method according to anyone of claims 1 to 3, wherein the cells are EB cells.

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7. The method according to anyone of claims 1 to 6, wherein the oligodendrocyte is of O1+ lineage.

8. The method according to anyone of claims 1 to 6, wherein the oligodendrocyte is of O4+ lineage.

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9. The method according to anyone of claims 1-8, wherein the demyelinating disease is selected from multiple sclerosis, stroke, spinal cord injury, neural trauma and demyelination of axon.

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10. Oligodendrocytes obtainable by a method according to anyone of claims 1 to 9.

11. A use of oligodendrocytes according to claim 10 in the manufacture of a medicament for treating damage caused by demyelinating diseases in a subject in need.

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12. A use of an embryonic stem (ES), embryoid bodies (EB) and/or neurosphere (NS) cells and a gp 130 activator selected from CNTF, OSM, IL-6, IL6R/IL6 chimera and IL-11, in the manufacture of a medicament for enhancing

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oligocytes differentiation for treating demyelinating diseases in a subject in need.

5 13. The use according to claim 12, wherein the gp 130 activator is an IL6R/IL6 chimera, a mutein, functional derivative, active fraction, circularly permuted derivative or salt thereof.

14. The use according to claim 13, wherein the gp 130 activator is IL-6.

10 15. The use according to anyone of claims 12 to 14, wherein the cells are NS cells.

16. The use according to claim 15, wherein the NS cells are dissociated.

15 17. The use according to anyone of claims 12 to 14, wherein the cells are EB cells.

18. The use according to claim 12, for enhancing O1+ oligodendrocytes.

19. The use according to claim 12, for enhancing O4+ oligodendrocytes.

20 20. A pharmaceutical composition comprising ES, EB and/or NS cells and one or more gp 130 activators selected from CNTF, OSM, IL-6, IL6R/IL6 chimera and IL-11.

25 21. A pharmaceutical composition comprising ES, EB and/or NS cells and an expression vector encoding a gp 130 activator selected from CNTF, OSM, IL-6, IL6R/IL6 chimera and IL-11.

30 22. A pharmaceutical composition comprising engineered ES, EB and/or NS cells producing one or more gp 130 activators selected from CNTF, OSM, IL-6, IL6R/IL6 chimera and IL-11.

35 23. The pharmaceutical composition according to anyone of claims 20 to 22, wherein the gp 130 activator is IL6R/IL6 chimera, a mutein, functional derivative, active fraction, circularly permuted derivative or salt thereof.

24. The pharmaceutical composition according to claim 23, wherein the gp 130 activator is IL-6.

40 25. The pharmaceutical composition according to anyone of claims 20 to 24, for enhancing oligodendrocyte differentiation from NS cells.

26. The pharmaceutical composition according to claim 25, for enhancing oligodendrocyte differentiation from dissociated NS cells.

45 27. The pharmaceutical composition according to anyone of claims 20 to 24, for enhancing oligodendrocyte differentiation from EB cells.

50 28. A pharmaceutical composition comprising the oligodendrocytes according to claim 10.

29. A pharmaceutical composition according to anyone of claims 20 to 28 for treating damage caused by demyelinating diseases in a subject in need.
- 5 30. A culture medium suitable for promoting differentiation of embryonic stem (ES), embryoid bodies (EB) and/or neurosphere (NS) cells into oligodendrocytes comprising one or more gp 130 activators selected from CNTF, OSM, IL-6, IL6R/IL6 chimera and IL-11 in a solution suitable for culturing the cells.
- 10 31. The culture medium according to claim 30, wherein the gp 130 activator is IL6R/IL6 chimera, a mutein, functional derivative, active fraction, circularly permuted derivative or salt thereof.
- 15 32. The culture medium according to claim 31, wherein the gp 130 activator is IL-6.
- 20 33. The culture medium according to claims 30 or 32, suitable for promoting differentiation of embryonic stem (ES), embryoid bodies (EB) and/or neurosphere (NS) cells into oligodendrocytes of O1+ lineage.
34. The culture medium according to claims 30 or 32, suitable for promoting differentiation of embryonic stem (ES), embryoid bodies (EB) and/or neurosphere (NS) cells into oligodendrocytes of O4+ lineage.
- 25 35. A culture medium according to anyone of claims 30 to 34, wherein the solution is suitable for culturing EB.
- 30 36. A culture medium according to anyone of claims 30 to 34, wherein the solution is suitable for culturing NS.
37. A method of treatment of demyelinating diseases comprising the administration of an effective amount of the oligodendrocytes according to claim 10 to a subject in need.
- 35 38. The method according to claim 37, wherein oligodendrocytes are administered directly in the CNS of the subject in need.
39. The method according to claim 37, wherein the oligodendrocytes are administered by IV injection of the subject in need.
- 40 40. A method of treating a demyelinating disease comprising the administration of ES, EB and /or NS cells and effective amount of one or more gp 130 activator selected from CNTF, OSM, IL-6, IL6R/IL6 chimera and IL-11 in a subject in need.
- 45 41. The method according to claim 40, wherein the gp 130 activator is an IL6R/IL6 chimera, a mutein, functional derivative, active fraction, circularly permuted derivative or salt thereof.
- 50 42. The method according to claim 41, wherein the gp 130 activator is IL-6.

43. The method according to anyone of claims 40 to 42, wherein the cells are NS cells.

5 44. The method according to claim 43, wherein the cells are dissociated NS cells.

45. The method according to anyone of claims 40 to 42, wherein the cells are EB cells.

10 46. The method according to anyone of claims 40 to 42, wherein the gp 130 activator is administrated by an expression vector.

47. The method according to anyone of claims 40 to 42, wherein the gp 130 activator is administrated by a recombinant cell expressing the activator.

15 48. The method according to anyone of claims 40 to 47, wherein the cells expressing the activator are ES cells.

20 49. The method according to anyone of claims 40 to 47, wherein the cells expressing the activator are EB cells.

50. The method according to anyone of claims 40 to 47, wherein the cells expressing the activator are NS cells.

25 51. The method according to anyone of claims 40 to 50, wherein the gp 130 activator is contacted with the cells ex-vivo prior to administration.

30 52. The method according to anyone of claims 40 to 51, wherein the gp 130 activator and/or the cells are administered directly in the CNS of the subject in need.

35 53. The method according to anyone of claims 40 to 51, wherein the gp 130 activator and/or the cells are administered by IV injection of the subject in need.

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